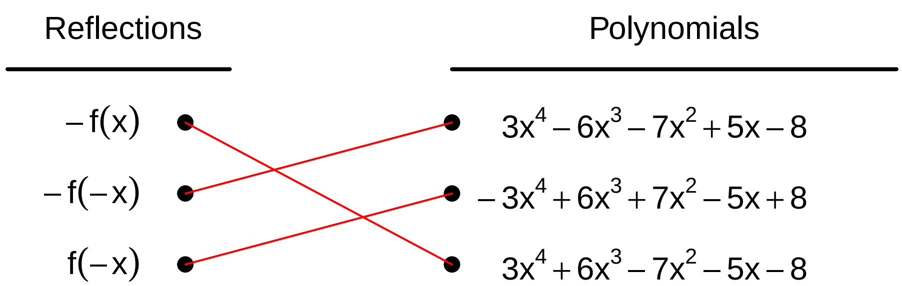
Name: Date:

Exam: Function Reflections (Solution version 6)

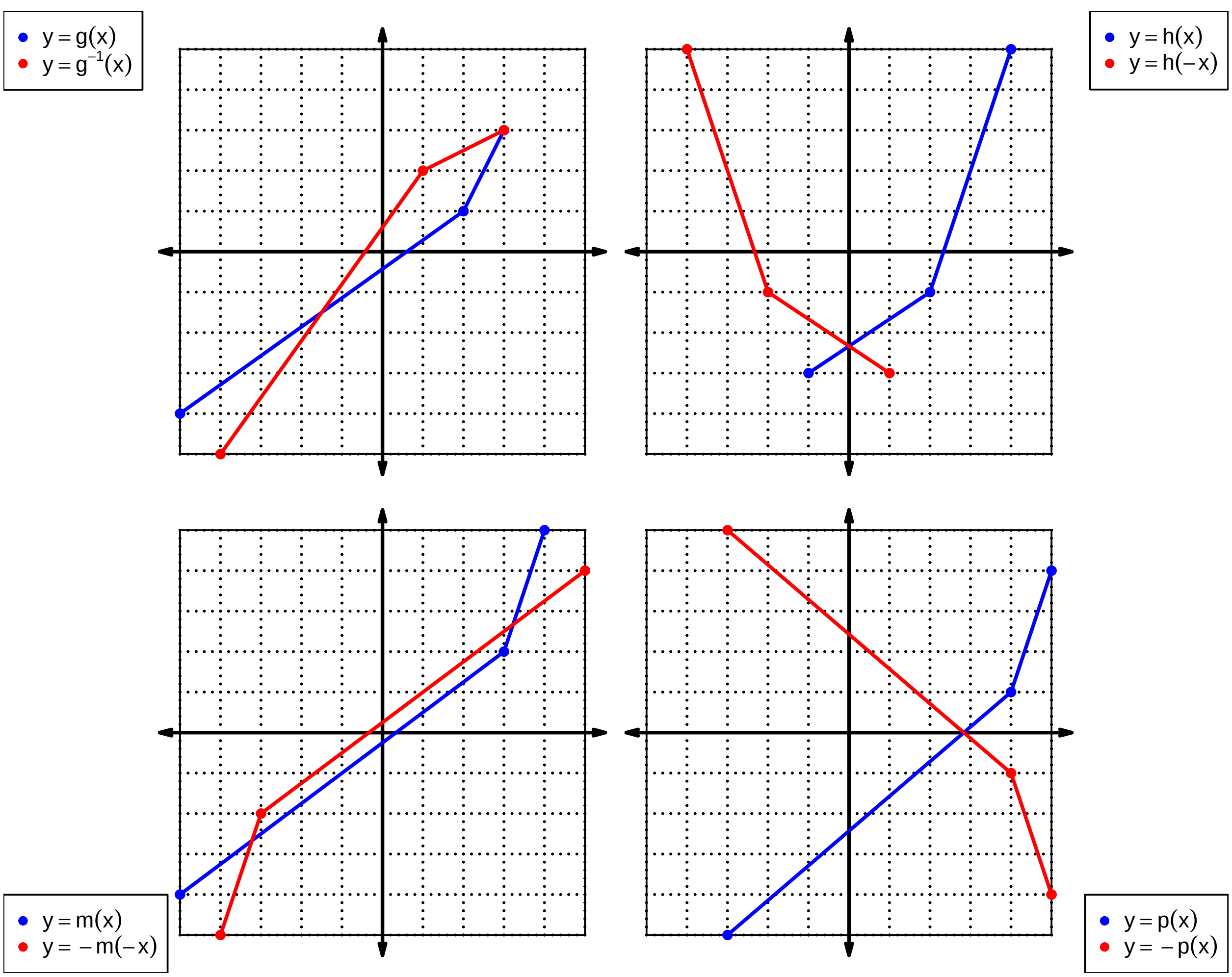
1. Let function f be defined by the polynomial below:

$$f(x) \;=\; -3x^4 - 6x^3 + 7x^2 + 5x + 8$$

Draw lines that match each function reflection with its polynomial:



2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	7	2	3
2	1	9	7
3	4	3	6
4	8	5	2
5	2	7	4
6	5	8	1
7	9	6	8
8	3	1	5
9	6	4	9

3. Evaluate $h(5)$.

$$h(5) = 4$$

4. Evaluate $f^{-1}(3)$.

$$f^{-1}(3) = 8$$

5. Assuming f is an **even** function, evaluate $f(-6)$.

If function f is even, then

$$f(-6) = 5$$

6. Assuming g is an **odd** function, evaluate $g(-7)$.

If function g is odd, then

$$g(-7) = -6$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) \;=\; x^3 + x$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$\begin{aligned} p(-x) &= (-x)^3 + (-x) \\ p(-x) &= -x^3 - x \end{aligned}$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$\begin{aligned} -p(-x) &= -\left(-x^3 - x\right) \\ -p(-x) &= x^3 + x \end{aligned}$$

   c. Is polynomial p even, odd, or neither?

   odd

   d. Explain how you know the answer to part c.

   We see that $p(x) = -p(-x)$ for all x because $p(x)$ and $-p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an odd function.

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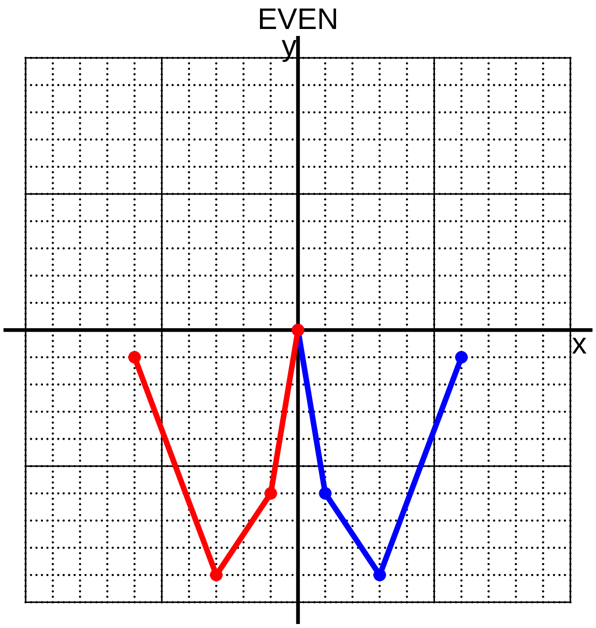
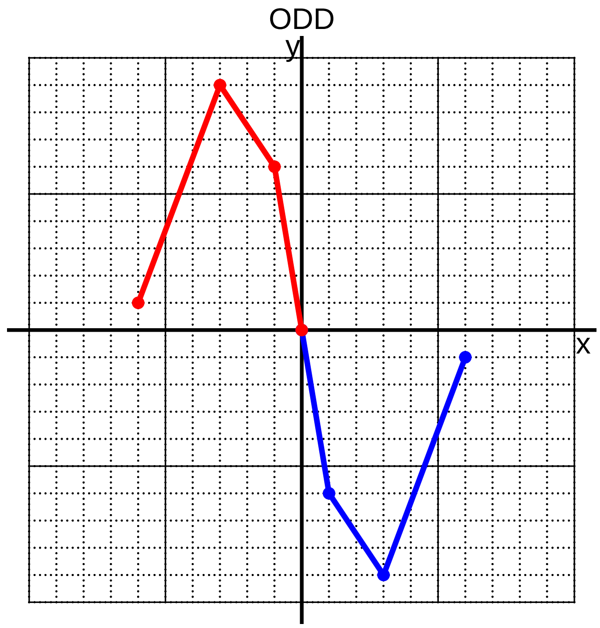
8. I have drawn half of a function. Draw the other half to make it even or odd.





9. Let function f be defined with the equation below.

$$f(x) = \frac{x}{5} - 7$$

a. Evaluate $f(95)$.

step 1: divide by 5
step 2: subtract 7

$$f(95) = \frac{(95)}{5} - 7$$
$$f(95) = 12$$

b. Evaluate $f^{-1}(9)$.

step 1: add 7
step 2: multiply by 5

$$f^{-1}(x) = 5(x+7)$$
$$f^{-1}(9) = 5((9)+7)$$
$$f^{-1}(9) = 80$$

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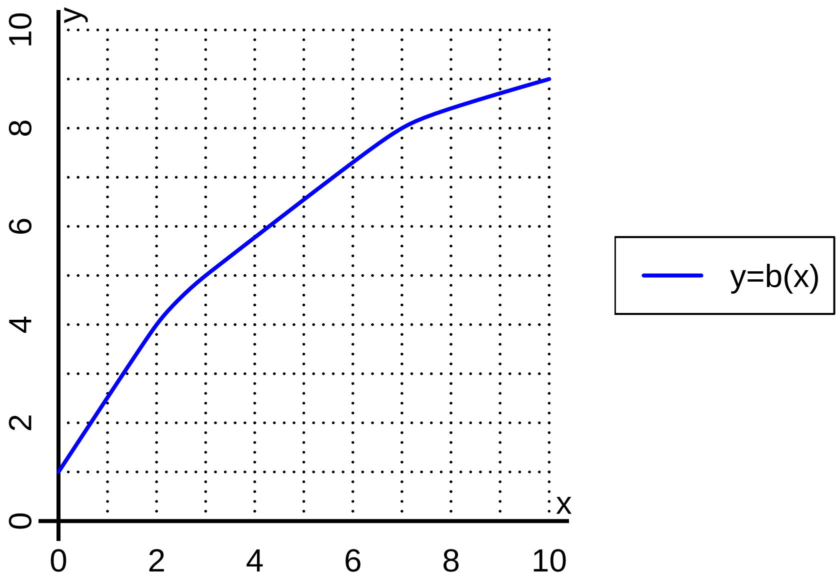
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(2)$.

$$b(2) \ = \ 4$$

b. Evaluate $b^{-1}(5)$.

$$b^{-1}(5) \ = \ 3$$

Exam: Function Reflections (Solution version 6)

11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-5	5	-5	5
-1	-9	9	9	-9
0	0	0	0	0
1	9	-9	-9	9
2	-5	5	-5	5

b. Is function f even, odd, or neither?

neither

c. How do you know the answer to part b?

Function f is neither because neither column $-f(-x)$ nor column $f(-x)$ matches column $f(x)$ exactly.